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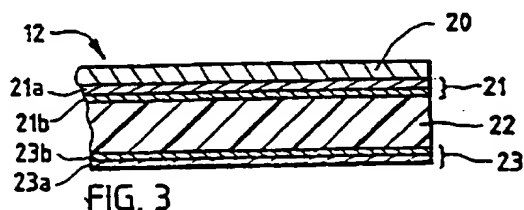
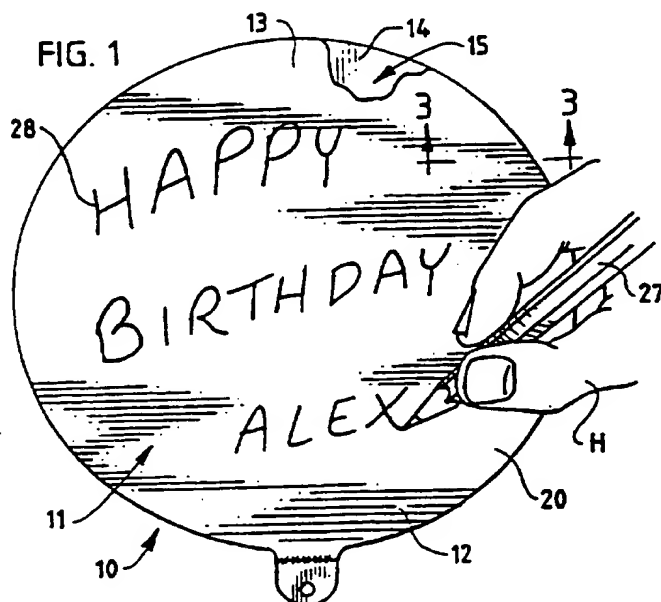
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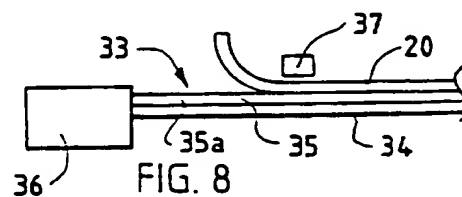
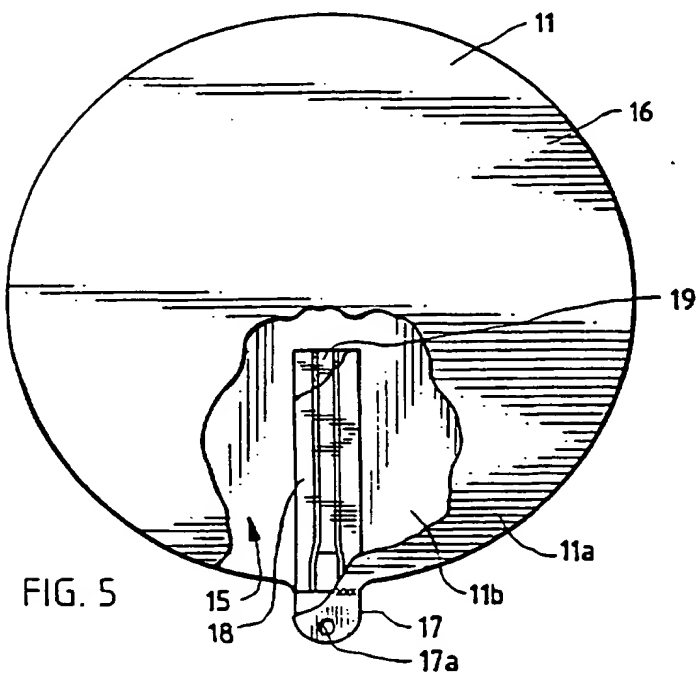
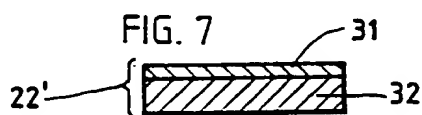
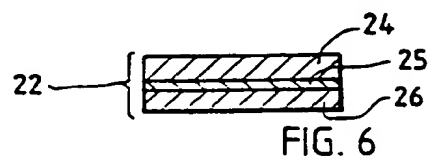
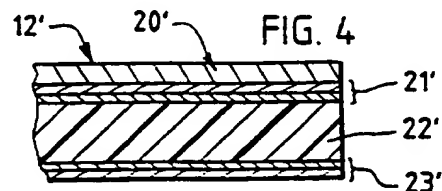
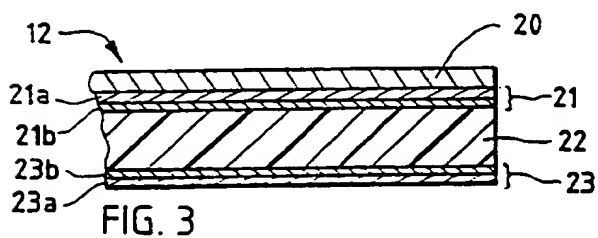
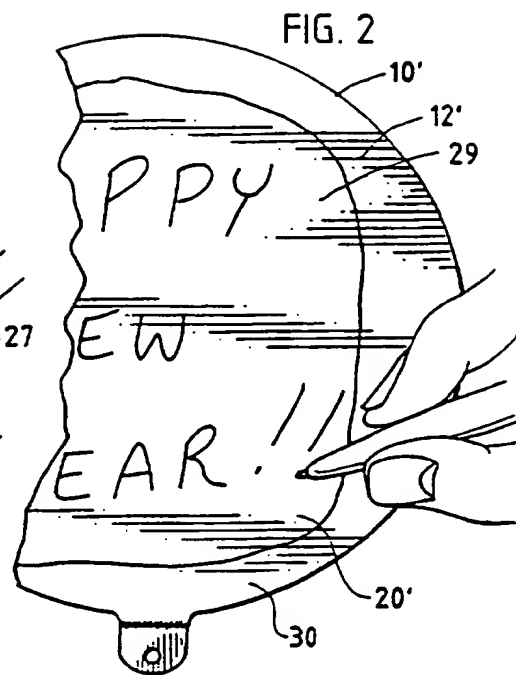
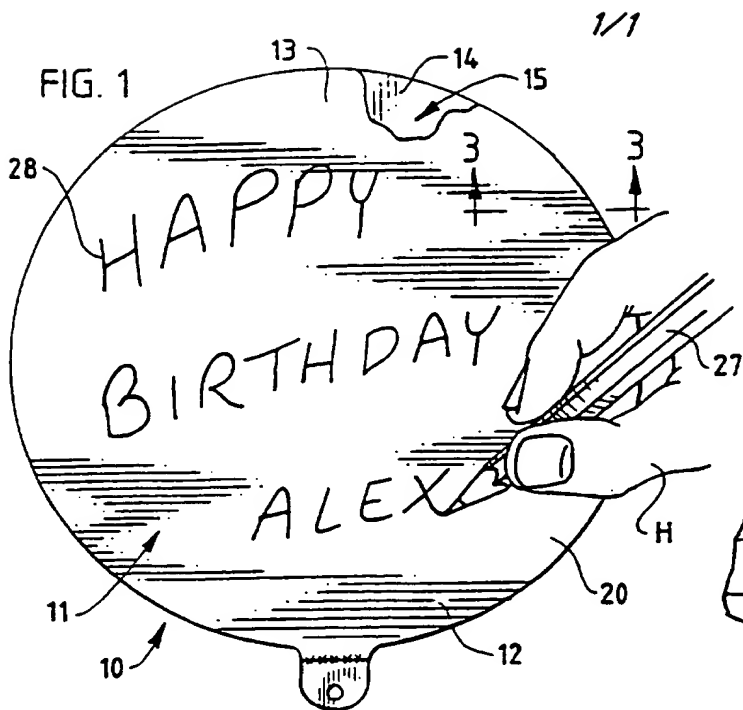
ONLINE:WPI,CLAIMS

(54) Laminate film for making a printable and markable balloon

(57) A laminate film for making a printable and markable balloon includes a readily printer paper layer (20) on at least a portion of its outer surface, the paper layer being bonded to a polymeric substrate (22) by a bonding layer (21) which includes an extrusion coating of a polyolefin resin. The polyolefin resin may include a colorant so that the resin provides an opaque background below the paper layer to enhance any graphics or messages printed thereon. In a preferred embodiment, the barrier layer and the entire balloon are non-conductive to electricity.



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NON-CONDUCTIVE PRINTABLE AND  
MARKABLE BALLOON AND METHOD OF MAKING

Background and Summary

This invention relates to the field of novelty items and greeting products and, more particularly, to novelty balloons which are commonly sold in card shops, flower shops, party stores, and the like.

Traditionally, balloons have been formed of latex. However, the popularity of latex balloons has diminished in recent years due to their inability to retain helium or other lighter-than-air media for sufficient periods of time. Recently-developed novelty balloons are formed of plastic or plastic composites which are often metallized so that the balloons retain helium or other lighter-than-air media for extended periods of time.

Such metallized plastic balloons have become quite popular and have become a fixture in the greeting card industry. Part of this success is due to the fact that such balloons include shiny metallized appearances and are printed with colorful graphics depicting well-known copyrighted figures (i.e., Mickey Mouse, Garfield, Dino, etc.) and including greeting messages. Typically, card shops which carry such balloons must carry a wide selection of balloons with pre-printed messages to accommodate a wide variety of situations such as balloons with messages that say "Happy Valentine's Day", "Happy Birthday", "Happy Anniversary", "Merry Christmas", etc. The consumer then selects a particular balloon from this vast array of balloons for the appropriate occasion. Such metalized balloons currently cannot be personalized by the retail store or consumer because the metalized outer surface is not readily amenable to being satisfactorily marked with common writing instruments.

In addition to the inability to mark personalized messages on metallized balloons, significant problems have occurred with metallized balloons due to the fact that the metallized surface is electrically conductive. Due to their ability to conduct electricity, it has been asserted that metallized balloons have caused problems with interfering with overhead power lines and have caused injuries to consumers, including electrocution. It is also believed that one state, California, is considering banning metallized balloons due to their potential for conducting electricity.

Alternatives to metallized balloons have been proposed in which the plastic composite or laminate layers of the balloon include a non-metallic layer of barrier material which renders the laminate substantially impermeable to lighter-than-air media such as helium. For example, a laminate film which has a high degree of impermeability to lighter-than-air media and which includes at least one layer of ethylene vinyl alcohol copolymer is disclosed in U.S. Patent No. 5,055,355. Such plastic laminate layers are non-conductive and retain lighter-than-air media. However, printing satisfactory graphics on such materials has proven to be difficult. This is because such materials are translucent and not enough ink will adhere to the laminate to render it opaque, which would otherwise provide a suitable surface for printing. Instead, the layer remains translucent and the resulting graphics look "cheap" and do not have the appeal of the crisp and clear graphics which have previously been applied to metallized balloons.

Accordingly, it is believed that there is a need in the industry for a non-conductive printable and markable balloon which would avoid the safety problems of metallized balloons and would provide a suitable surface for the application of multi-color graphics. It is also believed that the ability to

personalize the graphics on a balloon at the point of sale or after the consumer takes the product home would be highly advantageous. For example, a consumer could purchase a pre-printed balloon with the message "Happy Birthday," and the retail clerk or consumer could then add the recipient's name and other "personalized" information. Such objectives have not been achieved by the prior art balloons.

An important aspect of this invention therefore lies in providing a non-conductive printable and markable non-latex balloon which includes a markable area on at least a portion of the outer surface of the balloon which is amenable to printing with multi-color graphics and which is markable with common writing instruments, such as colored pencils, ballpoint pens, markers, etc., to allow the balloon to be personalized. Such results are achieved by forming the balloon of a laminate film which includes a markable area formed of paper.

In the preferred construction, the balloon is formed of a laminate film which includes four main layers: a first outer paper layer, a second bonding layer, a third substrate layer, and a fourth inner layer which includes heat-sealable material. The first paper layer is secured to the third substrate layer by the second bonding layer which may include a first sublayer of an extrusion coating of a polyolefin resin, such as polyethylene, secured to the paper layer and a second sublayer of a primer or other bonding agent between the extrusion coating and the substrate. The extrusion coating of the bonding layer preferably includes a colorant (preferably white) so that the bonding layer is substantially opaque and provides a suitable opaque background to the paper layer which enhances the clarity of any graphics which are printed thereon. The paper layer provides both a suitable surface for printing crisp and clear graphics at the point of manufacture as well as allowing the balloon to be

personalized by a store clerk or the consumer since the paper layer is amenable to being marked with common writing instruments.

The third substrate layer of the laminate film may or may not include one or more sublayers of a barrier material which is substantially impervious to lighter-than-air media such as helium. The presence of such a barrier sublayer in the third substrate layer allows the balloon to be inflated with lighter-than-air media such as helium so that the balloon will float when inflated. In the preferred construction, the barrier layer takes the form of a non-conductive polymeric material such as ethylene vinyl alcohol copolymer so that the laminate film and the balloon are not conductive of electricity. In constructions in which the conductivity of the balloon is not a concern, the balloon may instead include one or more layers of a metallized material in the laminate film so that it is substantially impermeable to lighter-than-air media such as helium.

The laminate films of this invention may be made in accordance with the method of this invention in which a paper layer is laminated to a composite film which includes a polymeric substrate and an extrusion coating of a polyolefin resin. The polymeric substrate and the extrusion coating are extruded through an extruder so that the extrusion coating is in a tacky state on the polymeric substrate for adhering the paper layer to the substrate. However, other methods may be employed to form the laminate film of this invention.

Other objects, features, and advantages of the present invention will become apparent from the following description and drawings which are by way of example and describe some embodiments of the invention.



Brief Description of the Drawings

Fig. 1 is a perspective view of a non-conductive printable and markable balloon embodying this invention.

Fig. 2 is a perspective view of an alternate embodiment of a printable and markable balloon embodying this invention.

Fig. 3 is a cross-sectional view of one embodiment of the laminate film which forms the balloon of this invention.

Fig. 4 is an alternate embodiment of the laminate film.

Fig. 5 is a somewhat schematic, fragmentary top plan view of the balloon of this invention.

Fig. 6 is a cross-sectional view of one embodiment of the substrate layer of the laminate film of this invention.

Fig. 7 is a cross-sectional view of another embodiment of the substrate layer of the laminate film of this invention.

Fig. 8 is a schematic view of the method of this invention of making the inventive laminate film.

Detailed Description of the Preferred Embodiments

Referring to the drawings, the numeral 10 generally designates the non-conductive printable and markable non-latex balloon of the present invention. Balloon 10 comprises an inflatable balloon body 11 formed of a laminate film 12. The laminate film 12 includes an outer surface 13 which forms the outermost surface of the balloon and an inner surface 14 which defines an interior chamber 15 of the inflatable balloon body 11. Inflatable balloon body 11 is shown in the form of a conventional balloon and the details of its construction are discussed below in connection with Fig. 5. However, it will be understood that the inventive laminate film 12 of this invention may be used to form inflatable balloon bodies of varied size, shape and form.

Referring to Fig. 5, inflatable body 11 includes front and back panels 11a and 11b which are respectively formed from

webs of the laminate film 12. A peripheral heat seal 16 seals the peripheral edges of the panels together to form the inner inflatable chamber 15. Inflatable body 11 includes a filler neck 17 which includes an aperture 17a to allow insertion of an inflation source (not shown). Opening 17a and filler neck 17 are in communication with a conventional self-sealing valve 18 which defines passageway 19. Upon insertion of an inflation source (not shown) into aperture 17a and injecting air, lighter-than-air gas, or other inflation media into filler neck 17, the inflating media forces passageway 19 open so that the medium fills inflatable chamber 15. Once the balloon has been filled and the injection of air or other media has stopped, the internal pressure within the balloon causes the extended length of self-sealing valve 18 to collapse and fold over inside of the balloon, sealing passageway 19. As mentioned, such a construction is conventional.

One embodiment of the inventive laminate film 12 of this invention is illustrated in Fig. 3. As shown, laminate film 12 includes four main layers: a first outer paper layer 20, a second bonding layer generally designated at 21, a third substrate layer 22, and a fourth inner layer 23. All of the layers are coplanar and secured together to form the laminate film 12 as a sheet or web of flexible film which is suitable for forming inflatable balloon bodies. The first paper layer 20 may be formed of any one of a number of well-known paper pulp products and the preferred paper layer is relatively thin and has high wet-strength. In one embodiment, the paper layer comprises a thin layer of 8-pound high wet-strength paper which is referred to as crepe paper and is commercially available from Burrows Paper Corporation, Little Falls, New York.

The second bonding layer 21 comprises bonding means interposed between the third substrate layer 22 and the paper

layer 20 for adhering the paper layer 20 to the third substrate layer 22. In the embodiment given in the illustrations, the bonding means take the form of a first sublayer 21a of a polyolefin resin-based extrusion coating, such as a layer of polyethylene, and a second sublayer 21b of a suitable primer or bonding agent for securing sublayer 21a to substrate 22. The resin-based coating sublayer 21a may advantageously include a colored concentrate (preferably white) so that layer 21 is substantially opaque. One suitable colorant is sold under the designation CM88100 and the name White Concentrate by Quantum Chemical Company of Cincinnati, Ohio. Providing such a colorant, which may be white or any other color, in the second bonding layer 21 provides an opaque background which enhances any graphics which are printed on the paper layer 20. The opaque second bonding layer 21 also covers the third substrate layer 22 which is often formed of a translucent material so that light cannot pass through the balloon which might otherwise detract from the clarity and appeal of any graphics which are printed on paper layer 20. During manufacture, paper layer 20 is applied to the polyolefin resin-based extrusion coating while it is still tacky or uncured and the resin coating adheres to the paper layer once it is fully cured. While polyethylene is believed to be one suitable material for forming the resin-based extrusion coating or sublayer 21a, it will be understood by those skilled in the art that other suitable resin-based polyolefins may also be used.

The second sublayer 21b may be formed of any one of a number of suitable primers or bonding agents for securing the polyolefin resin-based sublayer 21a to substrate 22. One such primer is sold under the name Mica and is commercially available from Mica Corporation of Stratford, Connecticut. However, it will be understood that other suitable bonding agents for forming a bond between the resin-based extrusion coating 21a and the

polymeric substrate 22 may also be used.

The fourth layer 23 provides a heat-sealable layer or surface for allowing the two panels 11a and 11b to be heat sealed together at the peripheral heat seal 16. The fourth layer 23 preferably is comprised of an outer sublayer 23a of a polyolefin resin-based extrusion coating and a sublayer 23b of a suitable primer or bonding agent for securing sublayer 23a to substrate 22. The outer sublayer 23a may be made of the same material as the material which forms the extrusion coating 21a of bonding layer 21 and the inner sublayer 23b may be made of the same material as the material which forms the sublayer 21b of the bonding layer 21. However, the outer heat-sealable sublayer 23b of sealant layer 23 can be formed of any one of a number of suitable polyolefin resins which will allow the panels 11a and 11b of the balloon to be heat sealed together to form inflatable body 11. The primer or bonding agent 23b also may take the form of any one of a number of suitable bonding agents for securing the outer heat-sealable layer 23a to polymeric substrate 22. In some constructions, the third substrate layer 22 may be formed of a heat-sealable material and a fourth layer 23 may be omitted.

Laminate film 12 can be constructed so that the resultant inflatable balloon body 11 does not float (i.e., the laminate film is not impervious to lighter-than-air media such as helium) or the laminate film can be constructed to allow the balloon to be filled with lighter-than-air media so that the inflatable balloon body 11 floats. If the balloon is to be constructed so that the inflatable body does not float, the third substrate layer 22 may take the form of a thin layer of any one of a number of polymeric materials such as a thin layer of high-density polyethylene, low-density polyethylene, linear low-density polyethylene, nylon, mylar, polypropylene, polyester, or composite laminates made of these or other similar thin,

flexible, plastic-like materials.

In constructions in which it is desirable for the inflatable balloon body 11 to float, the laminate film 12 includes barrier means or a barrier sublayer which may be disposed in the third substrate layer 22 so that the laminate film 12 is substantially impermeable to lighter-than-air media such as helium. In particular, the third substrate layer 22 may include at least one layer of a substantially impermeable material such as ethylene vinyl alcohol copolymer. Such layers of ethylene vinyl alcohol copolymer are disclosed in U.S. Patent No. 5,055,355, which is hereby incorporated by reference. In such constructions, the inflatable balloon body may be so made as to be "oversized" so as to contain greater amounts of lighter-than-air media, whereby the balloon will be able to float even though the paper layer 20 adds additional weight to the balloon.

A preferred construction of a third substrate layer 22 which includes such a layer of substantially impermeable material is shown in Fig. 6. The third substrate layer 22 includes a first sublayer 24 made of nylon, a second sublayer 25 made of ethylene vinyl alcohol copolymer, and a third sublayer 26 made of nylon. However, it will be understood that the polymeric layers 24 and 26 may be formed of other suitable polymeric materials. The sublayer of substantially impermeable material 25 may also be formed of materials other than ethylene vinyl alcohol copolymer. However, at least in the embodiments shown in FIGS. 1, 3 and 6, the sublayers of the third substrate layer 22, as well as all of the layers of the laminate film 12, must be formed of materials which do not conduct electricity so that the finished product, balloon 10, is non-conductive to electricity.

Referring to Fig. 1, inflatable body 11 is formed of laminate film 12 and is thus not conductive to electricity. Paper layer 20 covers substantially the entire outer surface 13

of the balloon which is readily printable with multi-color graphics. Such graphics may be printed by the manufacturer of the balloon may be personalized by the store clerk at the point of sale or by the consumer. As shown, a writer's hand H holds a pencil 27 which can be used to write a message 28 on the outer paper layer 20 of the inflatable body 11. The person personalizing the balloon may write the entire message 28 on the balloon or may simply add a person's name to an already pre-printed message such as "Happy Birthday", as shown.

While in the embodiment illustrated in Figs. 1, 3 and 6 the entire balloon is non-conductive and substantially the entire outer surface is printable and markable, it may be desirable in some applications for only a portion of the balloon to be markable, such as only one panel 11a or 11b, or even only a portion thereof, and the presence of metallized material in the balloon is not a concern. Referring to Fig. 2, balloon 10' is formed of a laminate film 12' and includes a markable area 29 formed of paper layer 20'. The markable area 29, which is formed of paper layer 20', may constitute only a portion of one side of the balloon as shown in Fig. 2 to provide a selected area for marking, may substantially cover only one side or panel of the balloon, or may be provided in various shapes, forms and sizes. The construction shown in Fig. 2 leaves an exposed area 30 formed of the second bonding layer 21 which may include a colorant to provide an aesthetic appearance. The remainder of the construction of the film 12' (layer 22' and 23') may be made in accordance with the embodiments previously discussed.

However, in a construction in which conductivity is not a concern and in which it is desirable for balloon 10' to float, the third substrate layer 22' may include at least one thin layer of metallized material to render it substantially impervious to lighter-than-air media such as helium. Referring to Fig. 7, one

embodiment of such a substrate layer 22' is shown which includes a thin metallized layer 31 and a polymeric layer 32. Metallized layer 31 may be formed with conventional processes known as vacuum metallizing in which the polymeric substrate 32 is run over a cooling roll and is exposed to a metallic vapor stream in a vacuum chamber. The metallic vapor material impinges upon the cooled polymeric layer 32 and condenses to a bright, shiny solid layer, as is well known. The polymeric substrate 32 may be constructed of a thin layer of high-density polyethylene, low-density polyethylene, linear low-density polyethylene, nylon, mylar, polypropylene, polyester or composite laminates made of these or other like materials. When the laminate 12' includes a substrate layer 22', the extrusion coating 21' covers the metallic layer 31 and provides an opaque background behind paper layer 20' which enhances the clarity and quality of any graphics which are printed thereon. As discussed previously in connection with the other embodiments, the substrate layer 22' may also include other barrier materials instead of a metallic layer 31, such as ethylene vinyl alcohol copolymer.

The laminate films 12 and 12' may be formed using an extrusion process and a subsequent laminating process in which the paper layer 20 or 20' is laminated onto the other layers of the laminate film. Referring to Figure 8, a composite film 33 includes a polymeric substrate 34 and a bonding layer 35 which preferably includes a polyolefin extrusion coating 35a which are all simultaneously extruded through an extruder 36. The coating 35a of bonding layer 35 may be formed of a polyolefin resin-based material which is still in a tacky state when it exits the extruder 33. The paper layer 20 may then be obtained from a source roll (not shown) and laminated, using a laminator 37, onto the extrusion coating 35a while it is still in a tacky condition. The extrusion coating 35a, once it cures, then bonds the paper

layer 20 to the base 34 of the remainder of the film 12. The base 34 may include a further heat-sealable layer 23 or one or more barrier layers as previously discussed.

The balloon of this invention is highly advantageous in that, in the preferred embodiment, the balloon is non-conductive to electricity but still provides an outer surface which is readily printable and markable for both the preprinting of desirable graphics and for personalization by a store clerk or consumer. The marking of the outer surface can be done with any readily-available marking or writing instrument. The non-conductive printable and markable balloon may be constructed either as a non-floating or floating balloon depending upon the particular application or target market.

While in the foregoing preferred embodiments of the invention have been disclosed in considerable detail, it will be understood by those skilled in the art that those details may be varied within the spirit and scope of the invention.



CLAIMS

1. A non-conductive printable and markable non-latex balloon comprising:

an inflatable balloon body formed of a laminate film and having an inner surface and an outer surface;

said laminate film being non-conductive to electricity and including a first paper layer which forms at least a portion of the outer surface of said inflatable balloon body, a second bonding layer, and a third substrate layer which is bonded to said first paper layer by said second bonding layer;

said first paper layer, said second bonding layer, and said third substrate layer being coplanar and secured together to form said laminate film.

2. A balloon as claimed in claim 1, in which said first paper layer comprises a thin layer of paper having high wet-strength.

3. A balloon as claimed in claim 1 or 2, in which said second bonding layer comprises a first sublayer composed of a polyolefin resin secured to said first paper layer and a second sublayer composed of a bonding agent and being interposed between said polyolefin resin and said third substrate layer.

4. A balloon as claimed in claim 3, in which said polyolefin resin comprises an extrusion coating of

polyethylene.

5. A balloon as claimed in claim 3 or 4, in which said bonding agent comprises a layer of primer.

6. A balloon as claimed in any one of the preceding claims, in which said second bonding layer is substantially opaque.

7. A balloon as claimed in any one of the preceding claims, in which said third substrate layer comprises a polymeric material.

8. A balloon as claimed in claim 7, in which said polymeric material includes nylon.

9. A balloon as claimed in claim 7 or 8, in which said polymeric material includes two sublayers of nylon with a sublayer of ethylene vinyl alcohol copolymer interposed between said two sublayers of nylon.

10. A balloon as claimed in any one of claims 7 to 9, in which said third substrate layer includes a barrier sublayer which is substantially impermeable to lighter-than-air media so that said inflatable balloon body retains lighter-than-air media when inflated.

11. A balloon as claimed in claim 10, in which said barrier sublayer comprises a least one sublayer of ethylene vinyl alcohol copolymer.

12. A balloon as claimed in any one of the preceding claims, in which said laminate film further

includes a coplanar fourth layer which forms the inner surface of said inflatable balloon body, said fourth layer including an inner sublayer of a heat-sealable polymeric material.

13. A balloon as claimed in claim 12, in which said heat sealable polymeric material comprises an extrusion coating of polyethylene and a bonding agent is interposed between said extrusion coating and said third substrate layer.

14. A printable and markable non-latex balloon comprising:

an inflatable balloon body formed of a laminate film and having an inner surface and an outer surface;

said laminate film including a polymeric substrate and a markable area which is formed of a paper layer and forms at least a portion of said outer surface of said inflatable balloon body;

bonding means for securing said paper layer to said polymeric substrate in a coplanar relation to form said laminate film.

15. A balloon as claimed in claim 14, in which said bonding means comprises a first sublayer of a first extrusion coating of a polyolefin resin secured to said paper layer and a second sublayer of a bonding agent interposed between said first sublayer and said polymeric substrate.

16. A balloon as claimed in claim 15, in which said first extrusion coating comprises a polyethylene and a colorant which renders said first extrusion coating substantially opaque.

17. A balloon as claimed in claim 15 or 16, further including a second extrusion coating of a coplanar heat sealable polymeric material which forms the inner surface of said inflatable balloon body and is secured to said polymeric substrate by a sublayer composed of a bonding agent.

18. A balloon as claimed in claim 17, in which said second extrusion coating comprises polyethylene.

19. A balloon as claimed in any one of claims 14 to 18, in which said laminate film further includes at least one barrier sublayer which is substantially impermeable to lighter-than-air media so that said inflatable balloon body retains lighter-than-air media when inflated.

20. A balloon as claimed in claim 19, in which said barrier layer comprises at least one layer of metallized material.

21. A balloon as claimed in claim 20, in which said metallized material is adhered to said substrate and is interposed between said substrate and said bonding means.

22. A laminate film for making non-

conductive printable and markable non-latex balloons,  
said laminate film comprising:

a substrate layer formed of a sheet of  
flexible polymeric material;

a markable layer formed of a sheet of paper  
and being coplanar with said substrate layer; and

bonding means interposed between said  
substrate layer and said markable layer for adhering  
said markable layer to said substrate layer, said  
laminate film being nonconductive to electricity.

23. A film as claimed in claim 22, in which  
said bonding means comprises a sublayer of a polyolefin  
resin secured to said paper layer and a primer layer  
interposed between said polyolefin resin and said  
substrate layer.

24. A film as claimed in claim 22 or 23, in  
which said bonding means is substantially opaque.

25. A film as claimed in any one of claims  
22 to 24, in which said laminate film includes barrier  
means for preventing lighter-than-air media from  
permeating said laminate film.

26. A balloon as claimed in claim 25, in  
which said barrier means comprises said substrate layer  
which includes at least one layer of ethylene vinyl  
alcohol copolymer.

27. A balloon as claimed in any one of  
claims 22 to 26, in which said laminate film further

includes a coplanar heat-sealable layer secured to said substrate layer by a primer layer.

28. A laminate film for making printable and markable non-latex balloons, said laminate film comprising:

a substrate layer formed of a sheet of flexible polymeric material;

a markable layer formed of a sheet of paper and being coplanar with said substrate layer; and

bonding means interposed between said substrate layer and said markable layer for adhering said markable layer to said substrate layer.

29. A film as claimed in claim 27, in which bonding means comprises a first sublayer of polyolefin resin secured to said paper layer and a primer layer interposed between said first sublayer and said substrate.

30. A film as claimed in claim 28 or 29, in which said bonding means is substantially opaque.

31. A film as claimed in any one of claims 28 to 30, in which said laminate film includes barrier means for preventing lighter-than-air media from penetrating said laminate film.

32. A film as claimed in claim 31, in which said barrier means comprises said substrate layer which includes at least one layer of ethylene vinyl alcohol copolymer.

33. A film as claimed in claim 31 or 32, in which said barrier means comprises a thin metallized layer interposed between said substrate layer and said paper layer.

34. A film as claimed in any one of claims 28 to 33, in which said laminate film further includes a heat-sealable layer on an inner surface of said substrate layer.

35. A method of making a laminate film which is useful for making a printable and markable non-latex balloon, said method comprising the steps of:

extruding a composite film including a polymeric substrate and an extrusion coating of a polyolefin resin through an extruder so that said polyolefin resin is in a tacky state; and

then, laminating a layer of paper onto said extrusion coating while said polyolefin resin is in said tacky state so that said paper layer is bonded to said composite film in a coplanar relation.

36. A method as claimed in claim 35, in which said method includes a further initial step of forming said polymeric substrate to include a barrier layer which is substantially impermeable to lighter-than-air media.

37. A method as claimed in claim 36, in which said barrier layer comprises one of a thin layer of metallized material and a thin layer of ethylene

vinyl alcohol copolymer.

38. A method as claimed in any one of claims 35 to 37, in which said method includes the further initial step of adding a colorant to said extrusion coating so that said extrusion coating is substantially opaque.

39. A method as claimed in any one of claims 35 to 38, in which said extrusion coating is made of polyethylene.

40. A method as claimed in any one of claims 35 to 39, in which said paper has high wet-strength.

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Amendments to the claims have been filed as follows

CLAIMS

1. A non-conductive printable and markable non-latex balloon comprising:

an inflatable balloon body formed of a laminate film and having an inner surface and an outer surface;

said laminate film being non-conductive to electricity and including a first paper layer which forms at least a portion of the outer surface of said inflatable balloon body, a second bonding layer, and a third substrate layer which is bonded to said first paper layer by said second bonding layer;

said first paper layer, said second bonding layer, and said third substrate layer being coplanar and secured together to form said laminate film.

2. A balloon as claimed in claim 1, in which said first paper layer comprises a thin layer of paper having high wet-strength.

3. A balloon as claimed in claim 1 or 2, in which said second bonding layer comprises a first sublayer composed of a polyolefin resin secured to said first paper layer and a second sublayer composed of a bonding agent and being interposed between said polyolefin resin and said third substrate layer.

4. A balloon as claimed in claim 3, in which said polyolefin resin comprises an extrusion coating of

polyethylene.

5. A balloon as claimed in claim 3 or 4, in which said bonding agent comprises a layer of primer.

6. A balloon as claimed in any one of the preceding claims, in which said second bonding layer is substantially opaque.

7. A balloon as claimed in any one of the preceding claims, in which said third substrate layer comprises a polymeric material.

8. A balloon as claimed in claim 7, in which said polymeric material includes nylon.

9. A balloon as claimed in claim 7 or 8, in which said polymeric material includes two sublayers of nylon with a sublayer of ethylene vinyl alcohol copolymer interposed between said two sublayers of nylon.

10. A balloon as claimed in any one of claims 7 to 9, in which said third substrate layer includes a barrier sublayer which is substantially impermeable to lighter-than-air media so that said inflatable balloon body retains lighter-than-air media when inflated.

11. A balloon as claimed in claim 10, in which said barrier sublayer comprises a least one sublayer of ethylene vinyl alcohol copolymer.

12. A balloon as claimed in any one of the preceding claims, in which said laminate film further

includes a coplanar fourth layer which forms the inner surface of said inflatable balloon body, said fourth layer including an inner sublayer of a heat-sealable polymeric material.

13. A balloon as claimed in claim 12, in which said heat sealable polymeric material comprises an extrusion coating of polyethylene and a bonding agent is interposed between said extrusion coating and said third substrate layer.

14. A printable and markable non-latex balloon comprising:

an inflatable balloon body formed of a laminate film and having an inner surface and an outer surface;

said laminate film including a polymeric substrate and a markable area which is formed of a paper layer and forms at least a portion of said outer surface of said inflatable balloon body;

bonding means for securing said paper layer to said polymeric substrate in a coplanar relation to form said laminate film.

15. A balloon as claimed in claim 14, in which said bonding means comprises a first sublayer of a first extrusion coating of a polyolefin resin secured to said paper layer and a second sublayer of a bonding agent interposed between said first sublayer and said polymeric substrate.

16. A balloon as claimed in claim 15, in which said first extrusion coating comprises a polyethylene and a colorant which renders said first extrusion coating substantially opaque.

17. A balloon as claimed in claim 15 or 16, further including a second extrusion coating of a coplanar heat sealable polymeric material which forms the inner surface of said inflatable balloon body and is secured to said polymeric substrate by a sublayer composed of a bonding agent.

18. A balloon as claimed in claim 17, in which said second extrusion coating comprises polyethylene.

19. A balloon as claimed in any one of claims 14 to 18, in which said laminate film further includes at least one barrier sublayer which is substantially impermeable to lighter-than-air media so that said inflatable balloon body retains lighter-than-air media when inflated.

20. A balloon as claimed in claim 19, in which said barrier layer comprises at least one layer of metallized material.

21. A balloon as claimed in claim 20, in which said metallized material is adhered to said substrate and is interposed between said substrate and said bonding means.

22. A laminate film for making non-

conductive printable and markable non-latex balloons,  
said laminate film comprising:

a substrate layer formed of a sheet of  
flexible polymeric material;

a markable layer formed of a sheet of paper  
and being coplanar with said substrate layer; and

bonding means interposed between said  
substrate layer and said markable layer for adhering  
said markable layer to said substrate layer, said  
bonding means comprising a sublayer of a polyolefin  
resin secured to said paper layer and a primer layer,  
said laminate film being nonconductive to electricity.

23. A film as claimed in claim 22, in which  
said bonding means is substantially opaque.

24. A film as claimed in claim 22 or 23, in  
which said laminate film includes barrier means for  
preventing lighter-than-air media from permeating said  
laminate film.

25. A film as claimed in claim 24, in which  
said barrier means comprises said substrate layer which  
includes at least one layer of ethylene vinyl alcohol  
copolymer.

26. A film as claimed in any one of claims  
22 to 25, in which said laminate film further includes  
a coplanar heat-sealable layer secured to said  
substrate layer by a primer layer.

27. A laminate film for making printable and

markable non-latex balloons, said laminate film comprising:

a substrate layer formed of a sheet of flexible polymeric material;

a markable layer formed of a sheet of paper and being coplanar with said substrate layer; and

bonding means interposed between said substrate layer and said markable layer for adhering said markable layer to said substrate layer, said bonding means comprising a sublayer of polyolefin resin secured to said paper layer and a primer layer.

28. A film as claimed in claim 27, in which said bonding means is substantially opaque.

29. A film as claimed in claim 27 or 28, in which said laminate film includes barrier means for preventing lighter-than-air media from penetrating said laminate film.

30. A film as claimed in claim 29, in which said barrier means comprises said substrate layer which includes at least one layer of ethylene vinyl alcohol copolymer.

31. A film as claimed in claim 29 or 30, in which said barrier means comprises a thin metallized layer interposed between said substrate layer and said paper layer.

32. A film as claimed in any one of claims 27 to 31, in which said laminate film further includes

a heat-sealable layer on an inner surface of said substrate layer.

33. A method of making a laminate film which is useful for making a printable and markable non-latex balloon, said method comprising the steps of:

extruding a composite film including a polymeric substrate and an extrusion coating of a polyolefin resin through an extruder so that said polyolefin resin is in a tacky state; and

then, laminating a layer of paper onto said extrusion coating while said polyolefin resin is in said tacky state so that said paper layer is bonded to said composite film in a coplanar relation.

34. A method as claimed in claim 33, in which said method includes a further initial step of forming said polymeric substrate to include a barrier layer which is substantially impermeable to lighter-than-air media.

35. A method as claimed in claim 34, in which said barrier layer comprises one of a thin layer of metallized material and a thin layer of ethylene vinyl alcohol copolymer.

36. A method as claimed in any one of claims 33 to 35, in which said method includes the further initial step of adding a colorant to said extrusion coating so that said extrusion coating is substantially opaque.

37. A method as claimed in any one of claims 33 to 36, in which said extrusion coating is made of polyethylene.

38. A method as claimed in any one of claims 33 to 37, in which said paper has high wet-strength.

39. A balloon substantially as hereinbefore described with reference to and as illustrated in any of the accompanying drawings.

40. A laminate film substantially as hereinbefore described with reference to and as illustrated in any of the accompanying drawings.

41. A method of making a laminate film substantially as hereinbefore described with reference to and as illustrated in any of the accompanying drawings.

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Claims searched: 1 to 40

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**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): A6S, B5N

Int Cl (Ed.6): A63H 27/10, B32B 27/10

Other: ONLINE: WPI, CLAIMS

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
X	US5,244,702A (Finestone)	at least 22 and 28
A	GB0,880,439A (Clupak)	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
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